REMARKS

The Office Action mailed March 24, 2004, has been received and reviewed. Claims 19, 21 through 23, and 25 through 34 are currently pending in the application. Claims 19, 21 through 23, 25, 27, and 29 through 34 stand rejected. Claims 26 and 28 have been objected to as being dependent upon rejected base claims, but the indication of allowable subject matter in such claims is noted with appreciation. Applicant has amended claim 19 and respectfully requests reconsideration of the application as amended herein and in light of the arguments set forth hereinbelow.

Objection to the Title

The Examiner objects to the title of the invention stating that it is not descriptive of the invention to which the claims are directed. Applicant has amended the title herein and respectfully requests reconsideration thereof.

Objection to the Claims

The Examiner objects to claim 19 stating that the limitation "the layer of electrically conductive epoxy adhesive" at lines 12-13 lacks sufficient antecedent basis. Applicant has amended claim 19 herein to improve antecedent basis for the identified limitation. Applicant respectfully requests reconsideration and allowance of claim 19.

35 U.S.C. § 103(a) Obviousness Rejections

Obviousness Rejection Based on Japanese Patent No. 63-179537 to Yasuhide et al. in view of U.S. Patent No. 4,247,596 to Yee.

Applicant notes that Claim 19 is formally stated as being rejected under 35 U.S.C. § 103(a) as being unpatentable over Yasuhide (Japanese Patent No. 63-179537) **in view of *Schonhorn et al.* (U.S. Patent No. 4,377,619)** (see, Office Action, paragraph 2). However, based on the context of the rejection, it appears that claim 19 is intended to be rejected under 35 U.S.C. § 103(a) as being unpatentable over Yasuhide et al. (Japanese Patent No. 63-179537) in view of Yee (U.S. Patent No. 4,247,596). Applicant's subsequent remarks are based on this

assumption.

Applicant respectfully traverses this rejection, as hereinafter set forth.

M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:

> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, **the prior art reference (or references when combined) must teach or suggest all the claim limitations.** The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). (Emphasis added).

The 35 U.S.C. § 103(a) obviousness rejections of the claims are improper because the references relied upon by the Examiner fail to teach or suggest all of the limitations of the presently claimed invention.

Independent claim 19 of the presently claimed invention is directed to a method of fabricating a multi-die assembly. The method comprises: providing a substrate including a plurality of conductors; attaching at least one active face-down base die to the substrate in electrical communication with at least some of the plurality of conductors; providing a layer of electrically conductive epoxy adhesive to a back side of the at least one base die; placing a back side of at least one active face-up stack die on the layer of conductive epoxy adhesive; curing the layer of conductive epoxy adhesive and securing the back side of at least one stack die to the at least one base die; providing a direct electrical path between the at least one stack die and at least one of the plurality of conductors; and *electrically grounding the at least one base die via the layer of electrically conductive epoxy adhesive and the at least one stack die.*

The Examiner cites Yasuhide as disclosing a method of fabricating a multi-die assembly which comprises: providing a substrate (4) including a plurality of conductors (4-1); attaching at least one active face down base die (1) to the substrate in electrical communication with at least some of the plurality of conductors; providing a layer of joining material (1-1) to a back side of

the at least one base die; placing a back side of at least one active face up stack die on the layer of adhesive; securing the back side of at least one stack die to the at least one base die; providing a direct electrical path between the at least one stack die and at least one of the plurality of conductors, and electrically grounding at least one base die via the adhesive and at least one stack die. The Examiner cites Yee as disclosing the use of an electrically conductive epoxy adhesive and then concludes that it would have been obvious to one of ordinary skill in the art to modify the device of Yasuhide by using the electrically conductive epoxy of Yee. Applicant respectfully disagrees.

Applicant submits that, contrary to the Examiner's assertion, Yasuhide fails to teach or suggest *electrically grounding the at least one base die via the layer of electrically conductive epoxy adhesive and the at least one stack die.*

Considering Yasuhide, the entire translated portion thereof includes the following:

> **PURPOSE**: To laminate devices on a circuit board in a three-dimensional form and to improve mounting effect, by bonding the surfaces of the semiconductor devices, on which circuits are not formed.
>
> **CONSTITUTION**: A face-down type semiconductor device 1 is mounted on lands 4-1 on a circuit board 4 by reflow soldering method. After the upper surface is washed, the surface of a care chip type semiconductor device 2, on which circuits are not formed, is stacked and bonded on said upper surface of the device 2 with a bonding agent 1-1. After electrode pads 2-1 of the bare-chip type semiconductor device 2 are washed, the pads 2-1 are wire-bonded to the lands 4-1 of the circuit board 4 through bonding wires 2-2. The surfaces of the semiconductor devices, which are substantially vacant regions, are assembled in a three-dimensional pattern and mounted as double layers. Thus the mounting efficiency on the circuit board can be improved. (Yasuhide, cover page).

Nowhere in the *Purpose* or *Constitution* does Yasuhide teach or suggest *electrically grounding the at least one base die via a layer of electrically conductive epoxy adhesive and the at least one stack die.* Nor does Yee teach or suggest such subject matter.

While the Examiner cites Yee as teaching an electrically conductive epoxy adhesive, such is taught in the context of adhering a polymeric, silver-coated fiber to the bond pads of a semiconductor package or to bond pads of a printed circuit board. The fact that Yee discloses the existence of an electrically conductive epoxy does not rise to the level of teaching or suggesting *electrically grounding the at least one base die via a layer of electrically conductive epoxy adhesive and the at least one stack die.*

Moreover, Applicant submits that there is a lack of motivation to combine the teachings of Yasuhide with Yee. The Examiner has not presented any motivation to replace the bonding agent 1-1 of Yasuhide with an electrically conductive epoxy other than for the securement of the semiconductor stack package. (See, Office Action, page 3). The bonding agent 1-1 of Yasuhide appears to provide the exact function which is proposed by the Examiner as motivation for combination of Yasuhide with Yee and there is simply no suggestion or motivation found within the disclosures of Yasuhide or Yee that the bonding agent 1-1 should be replaced for any purpose. Furthermore, assuming that there was ample motivation to combine Yee with Yasuhide (and Applicant maintains to the contrary), such a combination does not result in the affirmative act of *electrically grounding the at least one base die via a layer of electrically conductive epoxy adhesive and the at least one stack die* as discussed hereinabove.

Applicant, therefore, submits that claim 19 is clearly allowable over the combination of Yasuhide and Yee and respectfully request reconsideration and allowance thereof.

Obviousness Rejection Based on Japanese Patent No. 63-179537 to Yasuhide et al. in view of U.S. Patent No. 4,247,596 to Yee and further in view of U.S. Patent No. 5,323,060 to Fogal et al.

Claim 21-23, 25, 27, 29 and 33-34 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Yasuhide et al. (Japanese Patent No. 63-179537) in view of Yee (U.S. Patent No. 4,247,596) and further in view of Fogal et al. (U.S. Patent No. 5,323,060). Applicant respectfully traverses this rejection, as hereinafter set forth.

Applicant notes that claims 21-23, 25, 27, 29 and 33-34 are each dependent from claim 19 either directly or by way of intervening claims. The Examiner relies on Yasuhide and Yee as rendering obvious claim 19, as discussed hereinabove. The Examiner relies on Fogal as teaching a multi-chip semiconductor comprising various discrete components (75, 76 and 78), an adhesive layer (77) and various bond wires (44a, 44b and 79-81) connected with the discrete components. The Examiner concludes that it "would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Yasuhide et al. and Yee to provide additional necessary components." (Office Action, page 4). Applicant respectfully traverses this rejection.

As set forth herein above, the combination of Yasuhide and Yee clearly fail to render claim 19 obvious. More specifically, Yasuhide and Yee fail to teach or suggest *electrically grounding the at least one base die via a layer of electrically conductive epoxy adhesive and the at least one stack die.* Nor is there any motivation to combine Yasuhide and Yee in the manner proposed by the Examiner.

Applicant further submits that Fogal fails to teach or suggest the subject matter of providing a layer of conductive epoxy adhesive to a back side of the at least one base die; placing a back side of at least one active face-up stack die on the layer of conductive epoxy adhesive; and electrically grounding the at least one base die via said layer of electrically conductive epoxy adhesive and the at least one stack die.

Indeed, Applicant submits that Fogal teaches away from claim 19 of the presently claimed invention in that Fogal expressly teaches that the "[a]dhesive 38 [disposed between first chip 18 and second chip 28] preferably comprises an electrically *insulating* material" (col. 3, lines 8-9, emphasis added).

Applicant, therefore submits that claims 21-23, 25, 27, 29 and 33-34 are allowable over the combination of Yasuhide, Yee and Fogal either considered individually or in combination, and respectfully requests reconsideration and allowance of the same.

Obviousness Rejection Based on Japanese Patent No. 63-179537 to Yasuhide et al. in view of U.S. Patent No. 4,247,596 to Yee and further in view of U.S. Patent No. 5,399,898 to Rostoker

Claims 30 through 32 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Yasuhide et al. (Japanese Patent No. 63-179537) in view of Yee (U.S. Patent No. 4,247,596) and further in view of Rostoker (U.S. Patent No. 5,399,898). Applicant respectfully traverses this rejection, as hereinafter set forth.

Each of claims 30-32 depends from claim 19, either directly or through intervening claims. The Examiner relies on the combination of Yasuhide and Yee as applied to claim 19. The Examiner cites Rostoker as teaching least two active face down base dice and at least one stack die bridging the two base dice. The Examiner concludes that "it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Yasuhide et al. and Yee to provide a greater power dissipation and a natural convection cooling channel as shown by Rostoker." (Office Action, pages 5 and 6). Applicant respectfully disagrees.

As set forth above, Yasuhide and Yee clearly fail to teach or suggest all of the subject matter of the presently claimed invention as set forth in independent claim 19. Particularly, Yasuhide and Yee fail to teach or suggest providing a layer of electrically conductive adhesive and grounding the base stack die through the layer of electrically conductive epoxy adhesive. Applicant further submits that Rostoker fails to teach or suggest such subject matter.

Applicant, therefore, submits that claims 30-32 are allowable over Yasuhide, Yee and Rostoker, either considered individually or in combination, and respectfully requests reconsideration and allowance of the same.

Objections to Claims 26 and 28/Allowable Subject Matter

Claims 26 and 28 stand objected to as being dependent upon rejected base claims, but are indicated to contain allowable subject matter and would be allowable if placed in appropriate independent form. Applicant notes with appreciation the indication of allowable subject matter. However, as set forth hereinabove, independent claim 19, from which claims 26 and 28 depend,

is considered to be in condition for allowance. Applicant, therefore, respectfully requests reconsideration and allowance of claims 26 and 28.

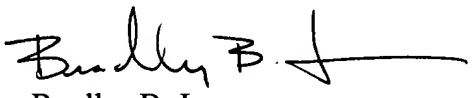
ENTRY OF AMENDMENTS

The amendment to claim 1 above should be entered by the Examiner because the amendments are supported by the as-filed specification and drawings and do not add any new matter to the application. Further, the amendments do not raise new issues or require a further search.

CONCLUSION

Claims 19, 21 through 23, and 25 through 34 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, he is respectfully invited to contact Applicant's undersigned attorney.

Respectfully submitted,



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Date: June 23, 2004
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